CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)
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Project Number
35293

Project Title
Generating Electricity Using a Toy Spinner

Abstract

Objectives/Goals
Approximately 1.3 billion people in the world do not have access to electricity for basic needs, but they do not know they can use simple techniques to generate it. There are many types of generators to produce electricity, but they do not utilize human arm power effectively. My goal is to create a fast and efficient toy spinner generator that utilizes human arm power.

Methods/Materials
A toy spinner rotates at a staggering 3000 RPM and I have harnessed this excessive rotational speed to create a simple generator. My toy spinner generator consists of 3 coils and 2 magnets. I measured the voltage and the RPM of several generators for a comparison of their efficiency. The best solution was to use a toy spinner because of its high rotational speed. A person repeatedly pulls and releases the cord at the ends of the spinner to cut the magnetic field rapidly and generate electricity.

Results
I found that 3 independent variables played key roles in my project. These independent variables were the length of the string on the toy spinner, the number of turns in the coils, and the distance between the magnets and the coils. These independent variables affected the dependent variable which was the voltage produced by my generator. I used a string length of 65 centimeters in my final generator compared to my older version which used a string length of 85 centimeters. By doing this, my generator was able to spin at about 3000 RPM. Normal hand crank generators spin at about 300 RPM. This is a 900% gain in RPM compared to regular hand crank generators.

Conclusions/Discussion
I#m able to design a toy spinner generator to provide more electricity than normal generators utilizing human arm power. The result of my experiment provides a practical solution to my proposed problem. In the future, this toy spinner generator may transform the way in which generators produce electricity to power portable devices.

Summary Statement
Toy spinner based electric generator for powering mobile devices in emergency situations.

Help Received
My science teacher, Ms. Anja Crickmore guided me along my project and Prof Dipendra Sinha of San Francisco State University inspired me to maintain my passion and focus.